***Weight Distributions for High School Math I – Guide based on Semester long classes***

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| **Domain (Conceptual Category)** | **Math I** |
| **Number and Quantity** | **5-10%** |
| **Algebra** | **25-31%** |
| **Functions** | **35-40%** |
| **Geometry** | **10-15%** |
| **Statistics and Probability** | **15-20%** |
| **Total** | **100%** |

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|  | **Subject: Math**  **Grade Level: Math I**  **Unit Title: Linear Equations and Inequalities in One Variable** | | **Time frame Needed for Completion:** | |
| **Unit 1** | **Unit 1: Linear Equations & Inequalities in One Variable**  **(2 weeks)**  ***Domain (s): Seeing Structure in Expressions***  ***NC.M1.A-SSE.1***  **Interpret the structure of expressions.**  **Standards:**  NC.M1.A-SSE.1 (Priority)  Interpret expressions that represent a quantity in terms of its context.  1a. Identify and interpret parts of a linear, exponential, quadratic expression, including terms, factors, coefficients, and exponents.  1b. Interpret a linear, exponential, or quadratic expression made of multiple parts as a combination of entities to give meaning to an expression.  ***Domain (s): Reasoning with Equations and Inequalities***  ***NC.M1.A -RE I***  **Understand solving equations as a process of reasoning and explain the reasoning.**  **Standards:**  NC.M1.A-REI 1 (Supporting)  Justify a chosen solution method and each step of the solving process for linear and quadratic equations using mathematical reasoning.  **Solve equations and inequalities in one variable.**  NC.M1.A-REI 3 (Priority)  Solve linear equations and inequalities in one variable.  ***Domain (s) Creating Equations***  ***NC.M1.A-CED***  **Create equations that describe numbers or relationships.**  **Standards:**  NC.M1.A-CED 1 (Priority)  Create equations and inequalities in one variable that represent linear, exponential, and quadratic relationships and use them to solve problems.  NC.M1.A-CED 3 (Priority)  Create systems of linear equations and inequalities to model situations in context.  NC.M1.A-CED 4 (Supporting)  Solve for a quantity of interest in formulas used in science and mathematics using the same reasoning as in solving equations. | | | |
| **Mathematics Practices:**  1. Make sense of problems and persevere in solving them.  2. Reason abstractly and quantitatively.  3. Construct viable arguments and critique the reasoning of others.  4. Model with mathematics.  5. Use appropriate tools strategically.  6. Attend to precision.  7. Look for and make use of structure.  8. Look for and express regularity in repeated reasoning. | | | |
| **Essential Question(s):**   1. What are algebraic properties and how are they useful in Algebra? 2. Describe situations where compound inequalities are used in life.   3. How do I solve a linear equation or inequality in one variable? | | | |
| **Key Vocabulary:**  **(Content)** | | **Key Vocabulary:**  **(Academic)** | |
| * Equations * Variable * Inequalities * Coefficient * Solution * Formulas * Constraints * Linear function * Quadratic functions * Exponential functions * Modeling * Absolute value * Coefficient * Constant * Coordinates | * Like terms * Ordered pair * Order of operations * Real number * Reciprocal * Variable * Exponent * Percent of change * Identity * No solution * Inverse operations * Solution * Absolute value * Compound inequality * Equation * Integers | * Justify * Explain * Construct * Represent * Argument * Create * Interpret |
| **Concepts: (I can…)**  **What Students Need to Know**:   1. I understand parts of an expression. 2. I understand how to solve equations using algebraic reasoning and I am able to explain that reasoning. 3. I can solve equations and inequalities in one variable. 4. I can solve equations and inequalities algebraically and graphically. 5. I can rewrite a formula and solve for different variables. | | Skills:  What Students Need To Be Able To Do:   1. Understand solving equations as a process of reasoning and explain the reasoning 2. Solve equations and inequalities in one variable 3. Represent and solve equations and inequalities graphically 4. Create equations and inequalities in one variable that represent linear, exponential, quadratic relationships, and use them to solve problems. | |
| **Instructional Strategies/Formative Assessment:**   * Develop learning targets that are student friendly * Discuss learning targets with students * Develop foundational understand of vocabulary * Collect evidence to show mastery * Adjust instruction as needed based on collected evidence * Use the 5 E’s : * Engage * Explore * Explain * Elaborate * Evaluate | | | |
| **Recommended Assessments:**  Daily Formative Assessments  Collaborative Assessments  Student Products  Common Formative Assessments (every 3 to 4 weeks)  Weekly Teacher made test  Daily “DO NOW”, “EXIT TICKET”  Quick writes  Find the error  Foldables  Groupwork  Projects  Graphic organizers  Venn Diagrams  Anticipation/prediction guides | | | |
| **Recommended Resources:**  **DPI website:** [**www.ncpublicschools.org**](http://www.ncpublicschools.org)  Algebra Resources  NCDPI Indicators  Instructional Resources  Common Core Unpacking the standards  Live Binder [www.livebinder.com](http://www.livebinder.com)  Google docs  Dropbox [www.dropbox.com](http://www.dropbox.com)  **Begin to include applications for each topic and open-ended questions**  [**http://www.doe.virginia.gov/instruction/mathematics/high/index.shtml**](http://www.doe.virginia.gov/instruction/mathematics/high/index.shtml)  [**http://www.smarterbalanced.org/smarter-balanced-assessments**](http://www.smarterbalanced.org/smarter-balanced-assessments) from given data? | | | |

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|  | **Subject: Math**  **Grade Level: Math I**  **Unit Title: Linear Functions** | | **Time frame Needed for Completion:** | |
| **Unit 2** | **Unit 2: Linear Functions (4 weeks)**  ***Domain (s) Creating Equations***  ***NC.M1.A-CED***  **Create equations that describe numbers or relationships.**  **Standards:**  NC.M1.A-CED.2 (Priority)  Create and graph equations in two variables to represent linear, exponential, and quadratic relationships between quantities.  NC.M1.A-CED.4 (Supporting)  Solve for a quantity of interest in formulas used in science and mathematics using the same reasoning as in solving equations.  ***Domain (s) Reasoning with Equations and Inequalities***  ***NC.M1.A-REI***  **Represent and solve equations and inequalities graphically.**  **Standards:**  NC.M1.A-REI.10 (Supporting)  Understand that the graph in a two variable equation represents the set of all its solutions to the equation.  **Domain: Interpreting Functions F-IF**  **Understand the concept of a function and use function notation.**  **Standards:**  NC.M1.F- IF 1 (Priority)  Build an understanding that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range by recognizing that:   * if *f* is a function and *x* is an element of its domain, then *f*(*x*) denotes the output of *f* corresponding to the input *x*. * the graph of *f* is the graph of the equation *y* = *f*(*x*).   NC.M1.F- IF 2 (Supporting)  Use function notation to evaluate linear, quadratic, and exponential functions for inputs in their domains, and interpret statements that use function notation in terms of a context.  **Interpret functions that arise in application in terms of the context.**  NC.M1.F- IF 5 (Priority)  Interpret a function in terms of the context by relating its domain and range to its graph and, where applicable, to the quantitative relationship it describes.  NC.M1.F- IF 6 (Priority)  Calculate and interpret the average rate of change over a specified interval for a function presented numerically, graphically, and/or symbolically.  **Domain: Expressing Geometric Properties with Equations**  **NC.M1.G-GPE**  **Use coordinates to prove simple geometric theorems algebraically.**  **Standards:**  NC.M1.G-GPE.4 (Supporting)  Use coordinates to solve geometric problems involving polygons algebraically   * Use coordinates to compute perimeters of polygons and areas of triangles and rectangles. * Use coordinates to verify algebraically that a given set of points produces a particular type of triangle or quadrilateral.   NC.M1.G-GPE.5 (Supporting)  Use coordinates to prove the slope criteria for parallel and perpendicular lines and use them to solve problems.   * Determine if two lines are parallel, perpendicular, or neither. * Find the equation of a line parallel or perpendicular to a given line that passes through a given point.   NC.M1.G-GPE.6 (Supporting)  Use coordinates to find the midpoint or endpoint of a line segment. | | | |
| **Mathematics Practices:**  1. Make sense of problems and persevere in solving them.  2. Reason abstractly and quantitatively.  3. Construct viable arguments and critique the reasoning of others.  4. Model with mathematics.  5. Use appropriate tools strategically.  6. Attend to precision.  7. Look for and make use of structure.  8. Look for and express regularity in repeated reasoning. | | | |
| **Essential Questions**   1. What are the advantages and disadvantages of using graphs, using equations, and using tables? 2. What are some real world applications which would use quadratic equations? 3. List examples where parallel and perpendicular lines are found in everyday items. | | | |
| **Key Vocabulary:**  **(Content)** | | **Key Vocabulary:**  **(Academic)** | |
| * Average rate of change * Quadrilateral * Slope * Calculate symbolically * Intercepts * Interval * Algebraic expressions * Graph * Function * Algebraically * Graphically * Numerically * Linear functions * Input/output * Solution | * Linear equation * Slope intercept * Point slope standard * X-intercept * Y-intercept * Linear * Parallel * Perpendicular * Distance * Midpoint * Pythagorean theorem * Perimeter * Identity * No solution * Inverse operations | * Compare * Estimate * Technology * Calculate * Compose * Determine * Relate * Context * Observe * Construct * Recognize |
| **Concepts: (I can……)**  **What Students Need to Know**:   1. I can determine if a relation is a function. 2. I can find the slope given two points, from a table, from a graph. 3. I can graph linear equations and inequalities from a table, from data contained in a problem. 4. I can write equations in point slope, slope-intercept and standard forms. 5. I can graph equations from point-slope, slope-intercept and standard forms. 6. I can solve systems of equations and inequalities and discuss the solution. 7. I can solve systems of inequalities, graph the solution understand parallelism and perpendicularity of lines. | | **Skills:**  **What Students Need To Be Able To Do:**  1. Understand the concept of a function and use function notation  2. Interpret functions that arise in applications in terms of the context  3. Analyze functions using different representations  4. Build a function that models a relationship between two quantities  5. Build new functions from existing functions  6. Interpret expressions for functions in terms of the situation they model | |
| **Instructional Strategies/Formative Assessment:**   * Encourage students to use “I CAN” statements * Develop learning targets that are student friendly * Discuss learning targets with students * Develop foundational understand of vocabulary * Collect evidence to show mastery * Adjust instruction as needed based on collected evidence * Use the 5 E’s : * Engage * Explore * Explain * Elaborate * Evaluate | | | |
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|  | **Subject: Math**  **Grade Level: Math I**  **Unit Title: Linear Equations and Inequalities in Two variables** | | **Time frame Needed for Completion:** | |
| **Unit 3** | **Unit 3: Linear Equations & Inequalities in two variables**  **(2 weeks)**  **Domain: Reasoning with Equations and Inequalities**  **A -REI**  **Standards:**  **Solve systems of equations**  **NC.M1.A-REI 5 (Priority)**  Explain why replacing one equation in a system of linear equations by the sum of that equation and a multiple of the other produces a system with the same solutions.  **NC.M1.A-REI 6 (Priority)**  Use tables, graphs, or algebraic methods (substitution and elimination) to find approximate or exact solutions to systems of linear equations and interpret solutions in terms of a context.  **Represent and solve equations and inequalities graphically**  **NC.M1.A-REI 11 (Priority)**  Build an understanding of why the *x*-coordinates of the points where the graphs of two linear, exponential, and/or quadratic equations *y* = *f*(*x*) and *y* = *g*(*x*) intersect are the solutions of the equation *f*(*x*) = *g*(*x*) and approximate solutions using graphing technology or successive approximations with a table of values.  **NC.M1.A-REI.12 (Supporting**)  Represent the solutions of a linear inequality or a system of linear inequalities graphically as a region of the plane. | | | |
| **Mathematics Practices:**  1. Make sense of problems and persevere in solving them.  2. Reason abstractly and quantitatively.  3. Construct viable arguments and critique the reasoning of others.  4. Model with mathematics.  5. Use appropriate tools strategically.  6. Attend to precision.  7. Look for and make use of structure.  8. Look for and express regularity in repeated reasoning. | | | |
| **Essential Question(s):**   1. How do you solve systems of equations using graphing, elimination, and matrices? 2. How do you solve systems of inequalities and graph the solution? 3. How can I write an equation that model given data? 4. What is the relationship between the domain and range of a function? 5. What is a linear equation? 6. What is the vertical line test for a function? 7. What are two examples of non-linear equations? 8. Given a set of ordered pairs, a graph, or a table, how would you determine if these relations are functions? | | | |
| **Key Vocabulary:**  **(Content)** | | **Key Vocabulary:**  **(Academic)** | |
| * Parallel * Solve * Angle * Variables * Circle * Perpendicular * Exact * Line segment * Point * Slope * Equation * System of equation | * Half-plane * Point of intersection * Approximately * Constraints * Coordinate * Origin * Distance * Circular arc * precision | * Create * Rearrange * Prove * Graph * Solve * Define * Distinguish * Recognize |
| **Concepts: (I can…..)**  **What Students Need to Know**:   1. I can create equations that describe numbers or relationships. 2. I can solve systems of equations. 3. I can represent and solve equations and inequalities graphically. 4. I can create and graph equations in two variables to represent linear, exponential, and quadratic relationships between quantities. 5. I can create systems of linear equations and inequalities to model situations in context. | | **Skills:**  **What Students Need To Be Able To Do:**   1. Create equations that describe numbers or relationships 2. Solve systems of equations 3. Represent and solve equations and inequalities graphically 4. Experiment with transformations in the plane 5. Prove geometric theorems 6. Use coordinates to prove simple geometric theorems algebraically 7. Create equations that describe numbers or relationships 8. Solve systems of equations 9. Represent and solve equations and inequalities graphically 10. Experiment with transformations in the plane 11. Prove geometric theorems 12. Use coordinates to prove simple geometric theorems algebraically | |
| **Instructional Strategies/Formative Assessment:**   * Encourage students to use “I CAN” statements * Develop learning targets that are student friendly * Discuss learning targets with students * Develop foundational understand of vocabulary * Collect evidence to show mastery * Adjust instruction as needed based on collected evidence * Use the 5 E’s : * Engage * Explore * Explain * Elaborate * Evaluate | | | |
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|  | **Subject: Math**  **Grade Level: Math I**  **Unit Title: Statistics and Exponential Functions** | | **Time frame Needed for Completion:** | | |
| **Unit 4** | **Unit 4: Statistics and Exponential Functions (3 weeks)**  ***Domain(s): Interpreting Categorical & Quantitative Data***  ***NC.M1.S-ID***  **Summarize, represent, and interpret data on two categorical and quantitative variables.**  Standards:  NC.M1.S-ID.1 (Supporting)  Use technology to represent data with plots on the real number line (histograms, and box plots).  NC.M1.S-ID.2 (Priority)  Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets. Interpret differences in shape, center, and spread in the context of the data sets.  NC.M1.S-ID.3 (Supporting)  Examine the effects of extreme data points (outliers) on shape, center, and/or spread.  NC.M1.S-ID.6 (Priority)  Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.  NC.M1.S-ID.6a  Fit a least squares regression line to linear data using technology. Use the fitted function to solve problems.  NC.M1.S-ID.6b  Assess the fit of a linear function by analyzing residuals.  NC.M1.S-ID.6c  Fit a function to exponential data using technology. Use the fitted function to solve problems.  **Interpret linear models**  NC.M1.S-ID.7 (Supporting)  Interpret in context the rate of change and the intercept of a linear model. Use the linear model to interpolate and extrapolate predicted values. Assess the validity of a predicted value.  NC.M1.S-ID.8 (Supporting)  Analyze patterns and describe relationships between two variables in context. Using technology. Determine the correlation coefficient of bivariate data and interpret it as a measure of the strength and direction of a linear relationship. Use a scatter plot, correlation coefficient, and a residual plot to determine the appropriateness of using a linear function to model a relationship between two variables.  NC.M1.S-ID.9 (Supporting)  Distinguish between association and causation.  ***Domain: Interpreting Functions***  **NC.M1.F-IF**  **Understand the concept of a function and use function notation.**  Standards:  NC.M1.F-IF.3 (Supporting)  Recognize that recursively and explicitly defined sequences are functions whose domain is a subset of the integers, the terms of an arithmetic sequence are a subset of the range of a linear function, and the terms of a geometric sequence are a subset of the range of an exponential function.  **Interpret functions that arise in applications in terms of the context.**  NC.M1.F-IF.4 (Supporting)  Interpret key features of graphs, tables, and verbal descriptions in context to describe functions that arise in applications relating two quantities, including: intercepts, intervals where the function is increasing, decreasing, positive, or negative; and maximums and minimums.  **Analyze functions using different representations**  Standards:  NC.M.1.F-IF.7 (Supporting)  Analyze linear, exponential, quadratic functions by generating different representations, by hand in simple cases and using technology for more complicated cases, to show key features, including: domain and range; rate of change; intercepts; intervals where the function is increasing, decreasing, positive, or negative; maximums and minimums; and end behavior.  NC.M1.F-IF.8 (Supporting)  Use equivalent expressions to reveal and explain different properties of a function.  NC.M1.F.IF.8a  Rewrite a quadratic function to reveal and explain different properties of a function  NC.M1.F.IF.8b  Interpret and explain growth and decay rates for an exponential function.  NC.M1.F-IF.9 (Priority)  Compare key features of two functions (linear, quadratic, or exponential) each with a different representation (symbolically, graphically, numerically in tables, or by verbal descriptions).  **Domain: Building Functions F-BF**  **Build a function that models a relationship between two quantities**  **Standard:** NC.M1.F-BF 1 (Priority)  Write a function that describes a relationship between two quantities.  NC.M1.F-BF.1a  Build linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two ordered pairs (include reading these from a table).  NC.M1.F-BF1b.  Build a function that models a relationship between two quantities by combining linear, exponential, or quadratic functions with addition and subtraction or two linear functions with multiplication.  NC.M1.F-BF.2 (Supporting)  Translate between explicit and recursive and forms of arithmetic and geometric sequences and use both to model situations.  **Domain: Linear, Quadratic, and Exponential Models**  **NC.M1. F-LE**  **Standards:**  **Construct and compare linear, quadratic, and exponential models and solve problems.**  NC.M1.F-LE 1 (Priority)  Distinguish between situations that can be modeled with linear functions and with exponential functions.  NC.M1.F-LE 3 (Supporting)  Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing, linearly, quadratically, or (more generally) as a polynomial function.  NC.M1.F-LE 5 (Supporting)  Interpret the parameters *a* and *b* in a linear function *f(x) = ax + b* or exponential function *g(x) = abx* in terms of a context. | | | | |
| **Mathematics Practices:**  1. Make sense of problems and persevere in solving them.  2. Reason abstractly and quantitatively.  3. Construct viable arguments and critique the reasoning of others.  4. Model with mathematics.  5. Use appropriate tools strategically.  6. Attend to precision.  7. Look for and make use of structure.  8. Look for and express regularity in repeated reasoning. | | | | |
| **Essential Question(s):**   1. What are the advantages and disadvantages of using graphs, using equations, and using tables? 2. What are some real world applications which would use exponential functions? 3. What is the domain and range in the context of the problems? 4. How can you tell whether a quantity relates to growth or decay? | | | | |
| **Key Vocabulary:**  **(Content)** | | **Key Vocabulary:**  **(Academic)** | | |
| * Average rate of change Exponential Function * Slope * Calculate * Symbolically * Intercepts * Interval * Algebraic expressions * Graph * Explicit expression * Explicit Formula * Function * Recursive * Algebraically * Exponential Decay * Graphically | * Arithmetic Sequence * Geometric Sequence * Numerically * Linear functions * Exponential functions * Input/output * Correlation * Causation * Regression * Mean * Median * IQR * Standard Deviation * Symmetry * Range | * Compare * Estimate * Technology * Calculate * Compose * Determine * Relate * Context * Recognize * Distinguish | * Prove * Model * Represent * Application * Interpret * Observe * Construct |
| **Concepts:**  **What Students Need to Know**:   1. I can use functional notation to solve a problem. 2. I can interpret functions that arise in applications in terms of the context 3. I can analyze functions using different representations. 4. I can construct and compare linear and exponential models and solve problems. 5. I can interpret expressions for functions in terms of the situation they model 6. I can summarize, represent, and interpret data. 7. I can summarize, represent, and interpret data with two categories and quantitative variables. 8. I can evaluate random processes underlying statistical experiments. 9. I can make inferences and justify conclusions from sample surveys and experiments. | | **Skills:**  **What Students Need To Be Able To Do:**   1. Understand the concept of a function and use function notation 2. Interpret functions that arise in applications in terms of the context 3. Analyze functions using different representations 4. Construct and compare linear and exponential models and solve problems 5. Interpret expressions for functions in terms of the situation they model 6. Summarize, represent, and interpret data on a   single count or measurement variable   1. Summarize, represent, and interpret data on   two categorical and quantitative variables   1. Interpret linear models 2. Understand and evaluate random processes   underlying statistical experiments  10. Make inferences and justify conclusions from sample surveys, experiments and observational studies. | | |
| **Instructional Strategies/Formative Assessment:**   * Encourage students to use “I CAN” statements * Develop learning targets that are student friendly * Discuss learning targets with students * Develop foundational understand of vocabulary * Collect evidence to show mastery * Adjust instruction as needed based on collected evidence * Use the 5 E’s : * Engage * Explore * Explain * Elaborate * Evaluate | | | | |
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|  | **Subject: Math**  **Grade Level: 8th**  **Unit Title: Polynomials and Quadratic Functions** | | **Time frame Needed for Completion:** | | |
| **Unit 5** | **Unit 5:**  **Polynomials and Quadratic Functions (3 weeks)**  **Domain: Arithmetic with Polynomials Expressions**  **NC.M1.A-APR**  **Perform arithmetic operations on polynomials**  **Standards:**  NC.M1.A-APR.1 (Priority)  Build an understanding that operations with polynomials are comparable to operations with integers by adding and subtracting quadratic expressions and by adding, subtracting, and multiplying linear expressions.  NC.M1.A-APR.3 (Priority)  Understand the relationship among the factors of a quadratic expression, the solutions of a quadratic equation, and the zeros of a quadratic function.  **Domain: Seeing Structure in Expressions**  **NC.M1.A-SSE**  **Standards:**  **Write expressions in equivalent forms to solve problems.**  NC.M1.A-SSE.3 (Priority)  Write an equivalent form of a quadratic expression *ax2+bx+c*, where *a* is an integer, by factoring to reveal the solutions of the equation or the zeros of the function the expression defines. | | | | |
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| **Essential Question(s):**   1. How do you find a vertex? 2. Understand the meaning of a maximum or minimum. 3. Describe the difference between a quadratic and exponential function. | | | | |
| **Key Vocabulary:**  **(Content)** | | **Key Vocabulary:**  **(Academic)** | | |
| * Graph * Function * Algebraically * Graphically * Solution * Numerically * Maxima/Maximum * Functions * Minima/Minimum * Polynomial * Input/ Output * Calculate * Domain/Range * Representation * Average rate of change * Intercepts * Operation | * Quadratic Function * Slope * Calculate * Symbolically * Zeros * Roots * Degree * Linear * Intercepts * Interval * Algebraic expressions * Factoring * Completing the square * Even and Odd functions * Polynomials | * Compare * Estimate * Technology * Calculate * Compose * Represent * Determine * Application * Relate * Interpret * Context | * Prove * Apply * Recognize * Distinguish * Model * Symbolically * Experiment * Illustrate * Interpret * Context * Observe |
| **Concepts: ( I can……)**  **What Students Need to Know**:   1. I can perform arithmetic operations on polynomials. 2. I can make a connection between zeros and factors of polynomials. 3. I can use function notation. 4. I can interpret functions in the context of a real-world application. 5. I can analyze functions using different representations. 6. I can build a function that models a relationship between two quantities. 7. I can build new functions from existing functions. | | **Skills:**  **What Students Need To Be Able To Do:**   1. Perform arithmetic operations on polynomials 2. Understand the relationship between zeros and factors of polynomials 3. Understand the concept of a function and use function notation 4. Interpret functions that arise in applications in terms of the context 5. Analyze functions using different representations 6. Build a function that models a relationship between two quantities 7. Construct and compare linear, quadratic, and exponential models and solve problems | | |
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|  | **Subject: Math**  **Grade Level: Math I**  **Unit Title: Quadratic Equations** | | **Time frame Needed for Completion:** | | |
| **Unit 6** | **Unit 6: Quadratic Equations (1 week)**  **Domain: Seeing Structure in Expressions**  **Interpret the structure of expressions**  **Standards:**  NC.M1.A-SSE.1 (Priority)  Interpret expressions that represent a quantity in terms of its context.  1a. Identify and interpret parts of a linear, exponential, quadratic expression, including terms, factors, coefficients, and exponents.  1b. Interpret a linear, exponential, or quadratic expression made of multiple parts as a combination of entities to give meaning to an expression.  **Write expressions in equivalent forms to solve problems**  NC.M1.A-SSE.3 (Priority)  Write an equivalent form of a quadratic expression *ax2+bx+c*, where *a* is an integer, by factoring to reveal the solutions of the equation or the zeros of the function the expression defines.  **Domain: Reasoning with Equations and Inequalities**  **Solve equations and inequalities in one variable.**  **Standards:**  NC.M1.A-REI.4 (Priority)  Solve for the real solutions of quadratic equations in one variable by taking square roots and factoring.  **Domain: The Real Number System**  **Extend the properties of exponents to rational exponents.**  **Standards:**  NC.M1.N-RN 2 (Supporting)  Rewrite algebraic expressions with integer exponents using the properties of exponents. | | | | |
| **Mathematics Practices:**  1. Make sense of problems and persevere in solving them.  2. Reason abstractly and quantitatively.  3. Construct viable arguments and critique the reasoning of others.  4. Model with mathematics.  5. Use appropriate tools strategically.  6. Attend to precision.  7. Look for and make use of structure.  8. Look for and express regularity in repeated reasoning. | | | | |
| **Essential Question(s):**   1. What are solutions of quadratic equations and how are they found? 2. What is the vertex, axis of symmetry, and roots from quadratic functions? 3. How do I graph quadratic functions? 4. How do I solve quadratic functions, including using the quadratic formula and completing the square? 5. How do I graph exponential functions? 6. How do I recognize exponential function? | | | | |
| **Key Vocabulary:**  **(Content)** | | **Key Vocabulary:**  **(Academic)** | | |
| * Graph * Explicit expression * Explicit Formula * Function * Recursive * Algebraically * Exponential Decay * Graphically * Arithmetic Sequence * Numerically * Geometric Sequence * Maxima/ Maximum * Linear functions * Minima/Minimum * Exponential functions * Input/output | * Calculate * Domain/Range * Representation * Average rate of change * Quadratic Function * Slope * Calculate * symbolically * Intercepts * Interval * Algebraic expressions * Factoring * Completing the square * Even and Odd functions * Polynomials * Intercepts * Operation | * Compare * Estimate * Technology * Calculate * Compose * Represent * Determine * Application * Observe * Prove * Apply | * Recognize * Distinguish * Model * Symbolically * Experiment * Illustrate * Relate * Interpret * Context * Identify * Construct |
| **Concepts:**  **What Students Need to Know**:   1. I can interpret the structure of expressions. 2. I can write expressions in equivalent forms to solve problems. 3. I can solve problems using the properties of exponents. | | **Skills:**  **What Students Need To Be Able To Do:**   1. Interpret the structure of expressions. 2. Write expressions in equivalent forms to solve problems. 3. Extend the properties of exponents | | |
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|  | **Subject: Math**  **Grade Level: Math I**  **Unit Title: Statistics** | | **Time frame Needed for Completion:** | | |
| **Unit 7** | **Unit 7 Statistics (2 weeks)**  **Domain: Interpreting Categorical and Quantitative Data**  **NC.M1.S-ID**  **Standards:**  **Summarize, represent, and interpret data on a single count or measurement variable**  NC.M1.S-ID.1 (Supporting)  Use technology to represent data with plots on the real number line (histograms, and box plots).  NC.M1.S-ID.2 (Supporting)  Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets. Interpret differences in shape, center, and spread in the context of the data sets.  NC.M1.S-ID.3 (Supporting)  Examine the effects of extreme data points (outliers) on shape, center, and/or spread.  **Standards**  **Summarize, represent, and interpret data on two categorical and**  **quantitative variables**  NC.M1.S-ID.6 (Priority)  Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.  NC.M1.S-ID.6a  Fit a least squares regression line to linear data using technology. Use the fitted function to solve problems.  NC.M1.S-ID.6b  Assess the fit of a linear function by analyzing residuals.  NC.M1.S-ID.6c  Fit a function to exponential data using technology. Use the fitted function to solve problems.  **Interpret linear models**  NC.M1.S-ID.7 (Supporting)  Interpret in context the rate of change and the intercept of a linear model. Use the linear model to interpolate and extrapolate predicted values. Assess the validity of a predicted value.  NC.M1.S-ID.8 (Supporting)  Analyze patterns and describe relationships between two variables in context. Using technology. Determine the correlation coefficient of bivariate data and interpret it as a measure of the strength and direction of a linear relationship. Use a scatter plot, correlation coefficient, and a residual plot to determine the appropriateness of using a linear function to model a relationship between two variables.  NC.M1.S-ID.9 (Supporting)  Distinguish between association and causation. | | | | |
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| **Essential Question(s):**   1. What are some real world applications which would use quadratic equations? 2. What are some real world applications which would use exponential functions? 3. How is the maximum or minimum of a quadratic equation found? Understand its representation 4. How do you find a vertex? 5. Explain the meaning of a maximum or minimum point. 6. Describe the difference between a quadratic and exponential function. 7. What are solutions of quadratic equations and how are they found? | | | | |
| **Key Vocabulary:**  **(Content)** | | **Key Vocabulary:**  **(Academic)** | | |
| * Statistics * Probability * Scatter Plot * Univariate * Bivariate * Patterns * Clustering * Outliers * Linear association * Nonlinear association | * Slope * Intercept * Variables * Frequencies * Equation of linear model * Quantitative variables * Line of best fit | * Compare * Estimate * Technology * Calculate * Compose * Represent * Determine * Application * Observe * Prove * Apply | * Recognize * Distinguish * Model * Symbolically * Experiment * Illustrate * Relate * Interpret * Context * Identify * Construct |
| **Concepts:**  **What Students Need to Know**:   1. I can summarize, represent, and interpret data. 2. I can summarize, represent, and interpret data with two categories and quantitative variables. 3. I can evaluate random processes underlying statistical experiments. 4. I can make inferences and justify conclusions from sample surveys and experiments. 5. I can reason quantitatively and use appropriate units to solve problems. | | **Skills:**  **What Students Need To Be Able To Do:**   1. Summarize, represent, and interpret data on a single count or measurement variable 2. Summarize, represent, and interpret data on   two categorical and quantitative variables   1. Interpret linear models 2. Understand and evaluate random processes   underlying statistical experiments   1. Make inferences and justify conclusions from sample surveys, experiments and observational studies. 2. Reason quantitatively and use units to solve problems. | | |
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